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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/781,820	02/12/2001	Bradley Paul Barber	L-122600	8550

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EXAMINER	
ROCCHEGIANI, RENZO	

ART UNIT	PAPER NUMBER
2825	

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/781,820	Applicant(s) BARBER ET AL.	
	Examiner Renzo N. Rocchegiani	Art Unit 2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-4,6-10,19 and 21-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4,6-10, 19 and 21-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 3, 6, 10, 19 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,915,203 (Sengupta et al.) in view of U.S. Patent No. 5,739,563 (Kawakubo et al.).

Sengupta et al. disclose a method of depositing a non-conductive layer, i.e. SiO2 (item 17) on a patterned titanium or aluminum electrode (item 15) and a substrate (item 11) and planarizing by CMP (col. 1, lines 65-67) the non-conductive layer so that the non-conducting layer has a height that is equal to the height of the patterned electrode. (Fig. 4).

Sengupta et al. do not disclose that a piezoelectric material is deposited over the planarized surface.

Kawakubo et al. teach the formation of a support layer made of piezoelectric material (item 54) over a planar surface comprising a dielectric (item 50) and a titanium electrode. (item 53).

It would have been obvious to one with ordinary skill in the art to combine the teachings of Kawakubo et al. to those of Sengupta et al., since Sengupta et al. teaches

a method to form integrated circuits eliminating step coverage problems and Kawakubo et al. teach the formation of an integrated circuit, thus one with ordinary skill in the art would be aware of the benefits in Sengupta et al. and be able to apply the process to the invention of Kawakubo et al. with an expectation of success.

Also, since the piezoelectric material is deposited over a planar surface, its mechanical integrity is inherently improved.

3. Claims 4, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,915,203 (Sengupta et al.) in view of U.S. Patent No. 5,739,563 (Kawakubo et al.) and in further view of U.S. Patent No. 5,324,683 (Fitch et al.).

As stated in paragraph 2, all the limitations of these claims have been met except for teaching that the substrate comprises silicon that the dielectric material is a low k material and that the planarization is done by polymer planarization.

Fitch et al. teaches a method of forming a semiconductor device comprising a substrate that may be of silicon (col. 5, lines 45-50) wherein it teaches that silicon dioxide is interchangeable with a low k dielectric (col. 5, lines 55-65) and wherein polymer planarization is interchangeable with CMP. (col. 8, lines 10-20).

It would have been obvious to one with ordinary skill in the art to combine the teachings of Fitch et al. to those of Sengupta et al., since Fitch et al. teaches the interchangeability of the material and process.

Furthermore it would have been obvious to one with ordinary skill in the art to use a substrate made of silicon, since it has been held to be within the general skill of a

worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 SUPQ 416.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,915,203 (Sengupta et al.) in view of U.S. Patent No. 5,739,563 (Kawakubo et al.) and in further view of U.S. Patent No. 4,885,262 (Ting et al.).

As stated in paragraph 2, all the limitations of these claims have been met except for teaching that the planarization is done by reflow and lift off.

Ting et al. teach that a dielectric may be planarized by reflow and/or lift-off process. (col. 1, lines 40-50).

It would have been obvious to one with ordinary skill in the art to planarize with reflow and lift-off, since Ting et al. teach that these are conventional and well known processes used in the art to planarize dielectric material. (col. 1, lines 40-50).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,915,203 (Sengupta et al.) in view of U.S. Patent No. 5,739,563 (Kawakubo et al.) and in further view of U.S. Patent No. 5,552,655 (Stokes et al.).

As stated in paragraph 2, all the limitations of the claims have been met except for teaching that the piezoelectric material is made of AlN.

Stokes et al. teaches a structure comprising AlN piezoelectric. (col. 3, lines 59-64).

It would have been obvious to one having ordinary skill in the specific art to combine the teachings of Stokes et al. to those of Kawakubo et al. since it has been held to be within the general skill of a worker in the art to select a known material on the

basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Response to Arguments

6. Applicant's arguments filed on May 18, 2004 have been fully considered but they are not persuasive. The examiner acknowledges applicant's amendment and thus has withdrawn the 102 rejection. Yet, the examiner was not persuaded by applicant's argument with respect to the obviousness rejection. Thus, all the claims are now rejected under 103. Applicant's main point is that the Kawakubo et al. reference does not teach depositing a piezoelectric material because it calls layer 54 a dielectric material. This argument is not persuasive. Layer 54 in the Kawakubo et al. reference is SrTiO3. This material is a dielectric as stated in Kawakubo et al. but it is also a piezoelectric material. The fact that Kawakubo et al. does not call layer 54 a piezoelectric material does not change the fact that SrTiO3 is a piezoelectric material. Thus, the limitation is rendered obvious and the rejection stands.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

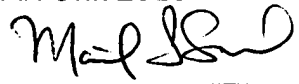
TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renzo N. Rocchegiani whose telephone number is (571)272-1904. The examiner can normally be reached on Mon.-Fri. 8:00 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571)272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Renzo N. Rocchegiani
Examiner
Art Unit 2825



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